

**Governor's Upper Yellowstone River Task Force**  
**Meeting Summary**  
**June 5, 2002**  
**Yellowstone Inn**  
**Meeting began at 7:00 pm**

**I. Introduction**

**Members Present:**

John Bailey, Chair  
David Haug, Vice Chair  
Roy Aserlind  
Doug Ensign

Jerry O'Hair  
Brant Oswald  
Ellen Woodbury  
Jim Woodhull

Bob Wiltshire

Hank Heasler, YNP Ex-Officio (proxy)  
Terri Marceron, USFS Ex-Officio  
Robert Ray, DEQ Ex-Officio

Laurence Siroky, DNRC Ex-Officio  
Stan Sternberg, DOT Ex-Officio  
Allan Steinle, Corps Ex-Officio

**Others Present:**

Liz Galli-Noble, Coordinator  
Duncan Patten, TAC Chair  
Bethany Rivard, Secretary  
Tom Hallin  
Jim Robinson  
Chuck Dalby

Lionel Dicharry  
Barbara Yoder  
Tina Laidlaw  
Bill Moser  
Rich Moy  
Karen Filipovich

Burt Williams  
Jeanne Marie Souvigny  
Randy Vogel  
Cheryl Jaworoswski

**II. Prior Meeting Minutes**

**Jerry O'Hair moved to approve the April 16, 2002 minutes. Dave Haug seconded the motion. The motion passed unanimously.**

**III. Financial Updates**

**1. Grant Spending Report:**

Liz Galli-Noble reported the following financial updates to the Task Force:

<b>EXPENDED GRANTS</b>			
<b>Grant Name</b>	<b>Completed</b>	<b>Amount</b>	<b>Study Component</b>
DNRC Watershed Planning Assistance Grant	6/30/99	2,100.00	Physical Features Inventory
DNRC HB223 Grant	7/30/99	10,000.00	Aerial photography
DNRC Riparian/Wetlands Educational Grant	6/30/00	960.99	<i>Hydrologic Response to the 1988 Fires Workshop</i>
DEQ 319 Grant (1 <sup>st</sup> )	9/30/00	40,000.00	Coordinator position
DNRC Watershed Planning Assistance Grant	1/31/01	10,000.00	Watershed Land Use Study
DEQ Start-Up Grant	6/26/01	49,138.00	Coordinator position, Admin Secretary, additional cross-sections, operating expenses.
DNRC HB223	10/1/01	6,500.00	Riparian Trend Analysis
BLM Funding	10/26/01	10,000.00	Wildlife Study
DEQ 319 Grant – 2 <sup>nd</sup>	3/21/02	58,000.00	Coordinator position
<b>CURRENT GRANTS</b>			
<b>Grant Name</b>	<b>Amount</b>	<b>Spent</b>	<b>Remaining Balance</b>
DNRC RDGP Grant (expires 12/31/02)	299,940.00	254,409.37	45,530.63
DEQ 319 Grant (3 <sup>rd</sup> ) (expires 6/20/03)	44,000.00	3,735.31	40,264.69

**IV. Brain Storming Session**

The Task Force revisited the original Issues/Topics/Wish List that they identified in December 1997 (see *Attachment A*). During this discussion Dr. Duncan Patten (TAC chair) was also asked to address how the Task Force-endorsed studies are addressing these issues/concerns?

**The following dialogue documents the discussion:**

**John Bailey:** Now we're going to have a brain storming session. It has been several years since we went through this process. Duncan has also talked about needing to hear from the Task Force members. So, the scientists have some idea of what we think we want. We decided at the last Task Force meeting that we should look at our "wish list" from the second or third Task Force meeting. So what I was thinking we could do is to take these categories one at a time. Let's go through this list again as a Task Force and see if you remember what we meant by it, and if we still agree with that. I think we've all learned things and we may modify what we meant. And through that discussion maybe we will move a little bit into what it is that we expect the data to show us and answer what our concerns are. The first thing that I think is interesting, as a Task Force, is our views on these things change. We may even be adding something to them. And I think it's important that we speak, so in a sense the science can hear about that.

Then, I thought we'd let Duncan somewhat reply to our thoughts, as to whether or not the data is going to answer the questions we're talking about. One of the things we'll have to do, is we'll take these one at a time, and once we get through them, then we get back into how the more complex issues tie together. I don't know quite how this is going to flow, but I think it will be very interesting.

The data is going to start rolling in beginning in September or October, so the timing is appropriate. I think we need to get some sense of what we want.

The first category on the list is "Inventory." What we know from currently available data, and what we need to find out. And I think some of that we may have done just through the research components we've commissioned. Let's just go through this Inventory list, the first item is "Fish Data".

**Duncan Patten:** I've gone through this list and made a transparency that illustrates where I think the data are. In other words, whether we're collecting it, or whether it's up there already somewhere.

**John Bailey:** Before you do that, I would like to go through this first with the Task Force, to remind us what we originally were thinking and to see if views have changed or whatever. I would then like you to show us what you've got. Because one of the things I'm trying to do is see if there's some things we hadn't articulated earlier. I mean, you keep saying the Task Force needs to tell you what we want. I was trying to get somewhat of a discussion from the Task Force members. I mean, yeah, we've built things from what we've done, but we want more. This format may not work, we may have to let you lead, but it would be best if the Task Force sort of started to speak up about these items, and then maybe you want to go through and find items in there that you want to address. Roy, do you have something to say? The first item is "fish data".

**Roy Aserlind:** Well, fish data is one of the primary motivators for the whole Task Force. Also, I think it is one of the elements that people will be looking at from all over the country.

**John Bailey:** Why is it important?

**Roy Aserlind:** Everybody likes to fish.

**John Bailey:** Does everybody on the Task Force like to fish?

**Roy Aserlind:** I hate to even bring up this word, but for "public relation" reasons. People ask, what does the Task Force do? It's something that the person on the street, the person in the bar, can understand. Maybe they can't understand geomorphology or hydrology—those are abstractions out there—but the number of Rainbows, Cutthroats, or Brown Trout on the Yellowstone River, they care about. I think the results of one of the key elements of this thing would be to keep referring to what is a healthy river.

**John Bailey:** We are addressing inventory items right now, so was the fish data there when we started, or not?

**Roy Aserlind:** We had some data from fish and wildlife, but nothing like we have today. Locations. I think one of the elements that we're looking at is the impact that these side channels have during high water periods and how they affect the fish.

**John Bailey:** Jerry?

**Jerry O'Hair:** Well, yes, I think fish data is important to collect. There was some data that was already collected and that was after the flood, and that's when the Task Force started.

**John Bailey:** And what about these other issues, what do you think is important? What's the most important one?

**Jerry O'Hair:** Well, I guess one of the big issues is to stabilize banks and the effect that it has on the river. I'm not sure that it's most important, but it's my understanding that prior to the time the Task Force was appointed, we had been talking to the Governor and there was a lot of concern about flooding on the Yellowstone and how to revamp some of the damage that was being done to private landowners. So, I think there are many numbers of things that are important.

**John Bailey:** But, from stabilized banks, I'm asking you this, this is "inventory", so I'm saying, did we get the inventory? I'm interested in the data you think we need to get you information.

**Jerry O'Hair:** I think that the data collected on the riprap needs to show cause and effect. In some places there's concern over the difficulty of permitting and protecting property. We need to discuss what's there and what ought to be there or shouldn't be there.

**John Bailey:** Let me ask you about one of these that's on here, it's TMDL.

**Jerry O'Hair:** At this point I'm not sure where TMDL is going. One of my concerns in all of these studies is the fact that we're studying a rather limited portion of the watershed [the corridor] in comparison to the actual watershed. And we have no control and no information available on the remaining balance of the watershed [the uplands], which makes up I think the largest portion of it. And so we have to react to what takes place in the study area within the watershed.

**John Bailey:** Doug? You weren't here when we made this list, so you can add to it now. We said in the beginning that under a category of inventory that these were things we thought we needed more information on. Do you have any comments about this? One of the things we're trying to do is at least tip the scientists off to things the Task Force members think we need to make decisions on.

**Doug Ensign:** I don't know if I would add anything more to that. We do need information to make decisions.

**John Bailey:** Do you think we've done enough? (No response) You can look at it longer if you'd like.

**Doug Ensign:** I will.

**John Bailey:** Okay. Bob?

**Bob Wiltshire:** A couple of things John, I don't know if this is the place to talk about this, but we've identified groundwater on this list, but are we collecting groundwater data?

**Ellen Woodbury:** Park County is doing a groundwater study down the valley. We should have some good information by this fall.

**Bob Wiltshire:** Well, the other comment is, I'm afraid that once we start hearing some possible culmination of results, we're going to say: Did you look at this? or Did you look at that? Unfortunately, we cannot tell the researchers what some of those things are until we see the data.

**John Bailey:** But do you think we're covering the most important things?

**Bob Wiltshire:** It seems to me that we're not really covering ground on the role of fires.

**John Bailey:** I don't know that we have data on that. The role of fires?

**Duncan Patten:** Our research isn't covering it, but others have. I think if you look at this list we have it covered. There's information out there from the USFS that covers most of this.

**Liz Galli-Noble:** We actually did an educational workshop specifically addressing fires.

**John Bailey:** But this is called inventory. I think the concern is, we have this list and are we comfortable with it. And if we're comfortable fine, we haven't really looked at this list since 1997.

**Brant Oswald:** Actually, one that, I mean a little bit like the groundwater thing that Bob mentioned, one that I thought was an interesting question is: Where is the gravel coming from and where did it go? It's certainly an interesting question.

**John Bailey:** I think that's a concern. Where are dumps causing problems? Do you have other issues?

**Brant Oswald:** Not really. The inventory list pretty much included all we have in the study.

**Jim Woodhull:** I would tend to agree with that John. I think we'll probably have things added to this list that come out of the study that we haven't thought of.

**John Bailey:** One of the things was just to make sure. We've been at this thing for some years; there's a learning process that goes with that. And we haven't stopped to say, okay, as we've learned all this and go back and look, maybe there are things we should be thinking about.

**Dave Haug:** Do we have a list of all the different types of riprap, the good and the bad factors of those? This is going to be something we'll have a lot of discussion on.

**John Bailey:** I think when we get to the health of the river, there'll be some discussion there.

**Ellen Woodbury:** My big issue as usual is the floodplain and I thought the floodplain maps were going to be available in the fall, and now I understand they're not. The floodplain maps that the USGS is supposed to be doing. Where are they at and when will they be available? We have a fairly lengthy adoption process that we have to go through to adopt them and, I originally thought they were going to be ready late summer/early fall, now I'm told it might be almost a year before they're available.

**Liz Galli-Noble:** The preliminary maps will be done and presented to the Task Force in late November, but they then have to go through an internal review within the USGS before official release.

**Ellen Woodbury:** But that's not something I can use.

**Liz Galli-Noble:** I would encourage Park County to talk to the USGS; interagency workings are not something that we deal with through the Task Force. The federal government has very strict standards on how and when they can release certain things.

**Ellen Woodbury:** But it won't be available for general use for another year.

**Liz Galli-Noble:** Until it goes through their review process, their maps will not be available for general release. How that affects Park County, I do not know.

**Ellen Woodbury:** That really concerns me, I guess. I have some real issues with that.

**Laurence Siroky:** Probably some of the policy options available whether it's 500-year floodplains or beyond, we can incorporate the geomorphology in the floodplains that might include some recent channel changes. Policy options include the City of Livingston having floodplain maps in their preliminary forms by November or December. Because they're preliminary, there's time to make adjustment. Determining whether a structure is in or out will happen then. We'll probably have public meetings and advertise them.

**John Bailey:** Do you have any other issues with inventory, Ellen?

**Ellen Woodbury:** Well, we had "role of fires" here on the list, and I'm not sure that the role of the fires is a very big issue anymore. It's been 14 or 15 years since the 1988 fires.

**Jerry O'Hair:** I think it is. I still think it has an effect.

**Ellen Woodbury:** I think it has an effect because the snow has a lack of covering, but I think a lot of the erosion factors have gone away because the ground is starting to recover in those areas.

**Jerry O'Hair:** Then how come the Yellowstone River looks like it does when it's raining?

**Ellen Woodbury:** Well, you know, it's muddy anyway. I guess I don't think it's all coming from the Yellowstone fires.

**Jerry O'Hair:** Along with it, I wonder if the data is going to be up to date with the Fridley Fire and the fires we had last fall. There's going to be a large or small cause-and-effect from those fires. The Fridley Fire was a rather large fire as fires go. It burned off a big watershed.

**John Bailey:** But let me ask you a question. I'm not sure there was any data taken from the sense of fires. So I don't know if we can relate the data to what the fires were doing.

**Duncan Patten:** We had a workshop addressing fire. There's data being collected in Yellowstone National Park, the effect of the overall sensitivity of the river.

**Terri Marceron:** Actually, we've got about five research studies that are associated with the Fridley Fire and the watershed. So, it's not a question that you couldn't use that. The research would certainly be available, and we've got the USGS and a number of folks (actually, graduate students) studying the effects of sedimentation. And we've got monitoring all over to determine high flows and runoffs and what the effect will be, but again that data collection is in that one drainage. Certainly the information will be available, and I think the Task Force, if they so choose, could use that data.

**John Bailey:** When would that data be available?

**Terri Marceron:** We're collecting it right now, so I could bring Duncan into the office and share it with him, and give you a better idea of how that interrelates to our study.

**John Bailey:** Would it be available this fall?

**Terri Marceron:** What we collect this summer will be. Some of this could take a couple years.

**John Bailey:** Well that's why I was wondering how much the Task Force could actually use, given our time line.

**Jerry O'Hair:** Doesn't that directly tie into TMDL?

**Terri Marceron:** My understanding is, and I'm sure I'll be corrected if I'm wrong, at times some of the TMDL is caused by more human causes, and this was a naturally caused fire. So even though there can be effects in terms of sedimentation, there's also recognition in that system that you do have natural events that come through. So we may have exceeded what we did in that creek, maybe some sediment, but that particular system recognizes that it wasn't a human caused event.

**Robert Ray:** What are the human factors, and what are the solutions to the human factors?

**Chuck Dalby:** I just want to make a general comment on the effects of fires. I think you cannot say if a fire is good, or fire is bad. The conditions that you start-off with in a watershed is affected by fire. The climate that the post-fire area is exposed to have a number of site-specific factors, the geology, soils, all those things that affect water goes into determining whether or not a particular fire has a certain effect. And in the workshop we did a pretty good job of addressing the 1988 fires. I don't think there's too much doubt by the time you get to Gardiner and down to Livingston, that the effect of those fires is very small, so small as to not be measurable. At the same time, we have experienced in Montana, particularly in the Helena area some pretty large rain-driven floods that have produced a lot of sediment. So, I think Jerry has a valid point. We need to look at each specific fire and it's effects.

**Ellen Woodbury:** I guess I would like to clarify when we talked about the role of fires in whatever year it was, 1997, we were talking about the 1988 Yellowstone fires, we weren't talking about any other fires.

**John Bailey:** Allan?

**Allan Steinle:** I think for the Corps, the primary issue has been cumulative impacts. There is a whole gamut of projects that we're thinking about learning how to permit. And I think what we're finding is that we're looking at any identifiable cause-and-effect relationship.

**John Bailey:** Terri?

**Terri Marceron:** Based on reading Task Force history and purpose, I think we've covered those issues of addressing the river channel and floodplain events. The only thing I'll bring up is from a cumulative effect perspective. Being that I work for a government agency—we are taking the words “cumulative effects” and really narrowing it down to a very small river quarter. And again, being the manager of a lot of the headwaters of the river, I want to emphasize that it was not identified [on the original list], and it is an inventory item and [could be] incorporated in the list. Again, the Task Force made that conscious decision and I want to make sure again that that's recognized. It doesn't sound like, based on the dialogue that's gone on before, that it's ever come up to be important yet. But I will give you that my flavor is that as a manager, when our forest goes through revision, we want to be able to be in concert with meeting the objectives of this planning of the river; and making sure that whatever our land management activities are on the headwaters, it's consistent. And again, it's a pretty big watershed and I want to make sure that we don't go down the road and identify some things we missed and find out something in the forest may have a big effect. I would be interested in what you have to say, Duncan, in terms of some of that.

**Duncan Patten:** This is sort of the broad-brush look at the watershed.

**Terri Marceron:** Well, we have roles and interactions in tributaries, but again, it's fairly limited. It's something that people just need to reflect on, we didn't identify it here, and that's okay.

**Duncan Patten:** Just to give you an idea, we have an EPA study where we picked Mill Creek because of all the lumbering in the headwaters of Mill Creek, and as far as we can tell there are no geomorphic impacts in the downstream areas.

**Terri Marceron:** And we continue to manage for that. Like I said, we need to work this out and try and make that connection.

**Hank Heasler:** The stance that has been expressed to me in Yellowstone National Park is that they are very interested in protecting the headwaters (water quality and quantity) and my view is that there is good, solid, initial inventory on that.

**John Bailey:** Joel?

**Joel Tohtz:** From an agency perspective, this is pretty exciting. What we're looking for is the meaning of “cumulative effects”. Intact process, function, and habitat seem to be key to the extent this information addresses where we're at and where we're headed. There's no particular detail I can see that's missing.

**John Bailey:** Stan?

**Stan Sternberg:** MDT is interested in roads and existing bridges and how they may affect the river. We're also interested in any background data that might be helpful for future bridges. We're looking at the socio-economic information, demographics, natural resource data, and fish data; particularly linked to any endangered species that may be in the area. We're interested in bank stabilization, and the flow of the river. Also, we're interested in wildlife patterns and any invasive species and weeds and things like that we have to manage. We're interested in the protection of wildlife but also in the protection of the public.

**John Bailey:** Robert?

**Robert Ray:** The new kid on the block. I see that the focus is the development of a restoration plan. Really what we want to get a hold on is what are the causes of the impairment of the stream? And what are the solutions and how can we get to those solutions?

**John Bailey:** Dave?

**Dave Haug:** Well I guess the main thing is the stabilization of banks. The more we address that the more we'll avoid heat from people outside of the state as far as what we are or are not doing on the Yellowstone River. I think that's one of the main reasons we formulated this Task Force was because if we didn't formulate something here locally, it was going to be done back in Washington DC. I think anything we can add to that will help us. Everything that's on the list is important in one fashion or another.

**John Bailey:** Before I ask for questions from the public, I'd like to just give a little history for some of those who have not been here before. When we were appointed, our authority was only in Park County. And we were appointed by Montana's Governor, who could not give us any authority in Yellowstone National Park. The

congressional delegation has moved money to us through the Corps, which has allowed us to take a much broader look than we originally envisioned. We aren't looking much at the upper drainage right now. Sticking to number one, inventory, I'm going to ask for comments from the public.

**Doug Ensign:** I'm prepared to make a statement. The stabilizing of banks is a major concern to landowners and ranchers. I'm not sure if the studies have taken in the positive aspect of stabilization. What happens if we don't stabilize the banks? Are there certain kinds of bank stabilization that would be more appropriate? Would even solid rock for a mile and a half protect some very valuable pieces of property? I don't know if we have that kind of information. I think it needs to be looked at if we're looking at the kind of impact that we're going to have on the river.

**Laurence Siroky:** It would be good if the socio-economic study looks at property loss from floods, and costs saved with revetment.

**John Bailey:** Now back to the public, any comments on inventory?

**Bill Moser:** I guess more than half of the people on this committee are no longer here.

**John Bailey:** No sir. Of the voting members, only two have changed out of twelve.

**Bill Moser:** Okay, I was counting twenty-one on the sheet.

**John Bailey:** Well, we had agency representative turnover, but all of the agencies are still here.

**Bill Moser:** I'm wondering if there's been any data collected on chemistry. Most of the chemistry doesn't change in most any other circumstances except turbidity. Stan talked about crossings, and I think that is one of the major things of this Task Force.

**John Bailey:** You're talking about bridges?

**Bill Moser:** I'm talking those things that are on the river that cause branches to snag up and cause flooding. And the other thing that's not on the list and that I know isn't going to be on the list is the possibility of the river changing its course and taking out the City of Livingston.

**John Bailey:** I think that will be addressed by our modeling. I'm not sure what the modeling will show, but that would probably be the closest.

**After there were no more public questions or comments, Duncan Patten was then asked to discuss how Task Force research is addressing these originally identified issues. See Attachment B for his overhead presentation.**

**Duncan Patten:** I think some of the concerns brought up tonight are legitimate. You ask, are we addressing all of them? In some cases not as thoroughly as one would like. And the other side of the coin is do we have the funds to address them as thoroughly as we'd like? Probably not.

I have broken down the full list of items of concern and then tried to figure out how we—the research investigations—are getting the data for each of the items.

**He then went down through the list of items and commented:**

I don't have the data for what TMDL is doing, but you can tie it to work that the USGS is doing; there's data out there. But starting from the beginning with fish data: basic FWP data is available, and there's also the work being done for the Task Force (wherever you see "TF" that's Task Force work), which includes the USGS-BRD people who are looking at fish habitat and then the MSU Fisheries Coop is looking at the fish population.

For stabilized banks: much of that data will show up in the fish habitat study. It'll also show up in terms of geomorphic studies. And the previously asked question that I jotted down regarding the positive effects of bank stabilization, I think some of that may show up in the socio-economic study—where people look at the positive side of protecting their property—because there's a value tied to that issue, I mean it's not necessarily a biophysically addressed issue. It reduces erosion, yes, but some of those stabilized areas are *the* source of sediment for the river. So we have a variety of things that will address stabilizing the banks.

Addressing "grazing and land use management practices", certainly we have the upland studies [watershed land use assessment and the physical features inventory] that have been done or are being done. For the "role of fires", I think we've pretty much covered that already at this meeting. The Forest Service is covering that, we sponsored a

workshop, and it certainly may still be of concern. For “woody debris”, the USGS-BRD is mapping woody debris in the main channel. For “chemistry”, we don’t have any chemistry study per say funded, but the USGS NAWQA program has sites in the Yellowstone River basin. For “roads and interactions with tributaries”, that’s one that we’re really not addressing per say. Farther up in Mill Creek and Tom Miner, we’re getting some data on another grant, outside the Task Force project.

**Chuck Dalby:** We are going to look at the effects indirectly. What we can do is look at tributary banks and gravel bars and see how they’ve changed over the last 50 years. That information will at least give you an idea.

**Duncan Patten:** For item “survey-topography”, basically we are doing topographic maps. For “groundwater losing and gaining”, as far as we know we have no studies, there is some literature and I think that’s what we’re going to have to base it on.

For the “flood plain” item, the USGS is mapping the 100- and 500-year floodplains. For historic changes we’re looking at a limited area within the study area. It’s interesting, when I look at some of this I remember a meeting nearly three years ago about the time this was put together. I raised my hand and said, “I think we ought to look at historic land use changes,” and I just about got ridden out of the room on a rail. We’ve come a long way since then because we realize the importance of everything that’s going on and that’s why it’s too bad we haven’t looked at the tributaries, because that’s another whole study.

Socio-economic really isn’t in here except for the possibility of bank stabilization, but it is in some of the other items that you addressed in other categories.

The hope is that as researchers pull their data together, the interrelation in these things solidifies; there is a whole geological background to this valley.

So, are there questions on this? The reason I did this was really for my own edification.

**John Bailey:** Any questions on this?

**Tina Laidlaw:** Doesn’t the DEQ have sites along the Yellowstone where they will be collecting water quality data; won’t they also be investigating tributaries listed for TMDLs?

**Duncan Patten:** Actually one thing we do have as far as tributaries are concerned is information on invertebrate communities. The only screwed up aquatic community out of any of the major rivers around here is in Big Sky. That’s what happens when you build a big resort on a little watershed.

**Laurence Siroky:** What about identifying protective activities, if they’re good or bad?

**Duncan Patten:** Do you mean bank stabilization? Some things may show up as good relative to fish habitat, because we’re looking at different types of bank stabilization, but in terms of the protection of land, I think that’s going to show up more in the protection of land as a valuable commodity in the socio-economic study. What’s a healthy river? That’s a question that’s farther out there. We’re talking about natural processes and habitat in this investigation, and obviously bank stabilization can short circuit those processes. But there are the tradeoffs. That’s why we have the socio-economic investigation.

**Laurence Siroky:** I have another question. What I would be interested in is the avoided costs in the stabilization of banks from flooding. What are the impacts? Are they large or small?

**Duncan Patten:** I would hope that would come out in socio-economics, that’s an economic thing. The data are there.

**Liz Galli-Noble:** I just read a summary statement from the Corps’ 905(b) report on the Yellowstone River, and they cited studies about economic losses in Park County in 1996-97. I don’t think that it would be too difficult to get that information, if requested. I don’t know if we directly requested that in the socio-economic study, but it should be easy to get on a very broad scale.

**Duncan Patten:** The other thing I have a question mark on is “watershed hydrology” with regard to the tributary issue. We may have some pretty good data on the streams coming off those recent fires, but most of the other streams don’t have gages on them.

**Roy Aserlind:** You look at number one up there [fish data], just as an example, and you boil that down to two investigations. Now, the thing that I question is that there are at least 18 of those variables that have an impact on fish.

**Duncan Patten:** Those that are looking at channel changes/hydrology, those that are looking at fish data, and those that are looking at riparian analysis all realize the interconnectedness between them. They have been communicating from the beginning. Their study designs take into account the need for overlap, for example the USGS-BRD group that's doing the fish habitat study is looking at the cross-sections.

**Roy Aserlind:** Next to the human mind, the most complex thing in the cosmos is a river system.

**Doug Ensign:** Liz, could you explain the cost of the flooding study that you read about in the Corps report?

**Liz Galli-Noble:** I was referring to a Corps report that I just read. There was county-level data collected post 1996/97 floods that focused on Yellowstone and Park Counties and how much damage was done. Just very broad numbers, it wasn't to the penny. It was \$2.2 million or \$4 million, they were large numbers. When Laurence asked the question, "Well how about what was saved," it reminded me of this report and the fact that they actually had comparative numbers; that is, had they not done thus and such the damage would have been \$14 million. I think that's what Laurence was trying to get at, so I said I think that some of that type of data may already be available.

**Doug Ensign:** The impacts of the floods in 1996 and '97, we're still paying for them.

**Bob Wiltshire:** I'd like to ask a question of Duncan. You mentioned that one of the things in retrospect was tributaries. To some extent that ties into what Jerry said about fires. Don't we have to look at some sort of an average? Things are always going to change in a basin that's as huge as the Upper Yellowstone.

**Duncan Patten:** Watersheds are constantly changing, but we still have some kind of historical variability. We are investigating major floodplains to see what changes have taken place. I think the whole concept of the range of natural historical variability is that as we see changes, are they really within that range? The farther back you can reach, the greater that variability is. And so we're going to have to live with the idea that this watershed is dynamic, it has lived with human impact.

**Bob Wiltshire:** I guess I was trying to make a point, at least to me that we're dealing primarily with the main stem of the river from Gardiner to Springdale, and how are we going to deal with bank stabilization in the future? We have to find a common ground as a Task Force as we make our decisions.

**Duncan Patten:** There are a set of criteria that allow you to make assessments, but whether we can get to that is anybody's guess at this point.

**John Bailey:** I can't imagine a consensus that would allow us to get to an average, maybe a range. I don't see our process leading us to averages.

**Doug Ensign:** I see bank stabilization going far beyond socio-economic. Bank stabilization is protecting wildlife and the spread of weeds. It seems to be that there is a degree of catastrophic flooding that we should try and limit. I think man in his wisdom needs to do something to modify the more damaging aspects.

**Duncan Patten:** This is a philosophical question: Do we stabilize a bank for the 50-year flood or the 25-year flood, and then forget about the 100-year flood? The connection of stream to floodplain enhances wildlife, you think you're protecting it but you're not in the overall scheme of things.

**John Bailey:** Will the data allow you to make a statement about bank stabilization and have the Task Force agree with you? Everyone here may have something they think is important, will we be able to get consensus?

**Robert Ray:** One thing that I think is important for the TAC to address is wildlife habitat: inventories for habitat within the riparian and stream areas.

**Jeanne Marie Souvigney:** One of the things we're not looking at are the processes that affect all these resources. Nowhere is there an evaluation of what the existing [permitting or management] processes are, and what's allowed in those processes, what's not allowed. I can't help but wonder, if we're going to have all this data, and someone at the end says, "the goal is to change our approach to permitting or management," and we haven't looked at these processes, then it's all sort of rhetorical. One thing that's missing is we're getting a lot of science, but we're not in the human component, which is the processes by which action is taking place, which affects these resources.

**John Bailey:** We talked about the permitting process way back. I think part of your question is being answered in the socio-economic study.

**Ellen Woodbury:** What I would say is that we have all this science, but what we're going to apply to that science is the values of the people at this table. The wildlife is important to some people, fisheries are important to some people, and protecting private property rights are important to some people. And somehow this Task Force is going to have to come to some value judgments. It's the socio-economics and that's where the bottom line is. We need to somehow get a process in place that gets this Task Force to that point, because we're not going to get anywhere until we do.

**Laurence Siroky:** Earlier I was talking about some policy options, and ordinances for managing floodplain activity.

**Brant Oswald:** It seems like the point that Jeanne is making is one piece of inventory that's missing. And I think she's right. Eventually what we'd like to do here is come to some consensus and make some recommendations on how regulatory agencies should act. Science is going to get us some information, but the thing we haven't acknowledged is how the system works. We might have some values that are the same and we might have some that are different, but in order for us to make any recommendations, all of us need to have some better understanding of how the permitting and regulatory agencies work.

**Liz Galli-Noble:** Isn't that why Ex-Officios are sitting at this table, to provide the information to us and help guide us through that process? We have the agencies sitting here so that when we make recommendations, there will be validity and application to federal, state, and local agencies. So can we ask the people sitting at this table to help us put a permitting inventory together? To me that doesn't seem like a difficult task.

**Brant Oswald:** I think one that I'd throw out is that I still don't understand the SAMP process. And I don't mean that facetiously at all, but I think that in talking to different people, how the SAMP actually comes together and how it can be applied to create policy is still misunderstood. I've looked at some documents, but I still don't have any vision on what the SAMP is going to do. One thing would be a workshop type of thing, try and get some understanding. The other SAMPs that we've seen examples of were not systems like the one we're looking at. Depending on what side of the fence you're on, the SAMP can be either the demon or the savior.

**Tina Laidlaw:** We're amassing different pieces of information, but what are the resources you're using? What is the management plan? You've got to get together the planning effort. Setting that out and saying okay, how are we going to reach that consensus? What are the tools you have, what is the latitude, the flexibility, what isn't the flexibility?

**Laurence Siroky:** I think that re-examination of agency policies are an integral part of the SAMP. As far as the SAMP itself and trying to understand the process, most of the examples I've seen are applied more to the urban setting. I haven't seen one for a river system such as this. There's probably some uncertainty on everybody's part including ours, but we do have basic guidelines for developing a SAMP. And I would say that public involvement as we go through the SAMP process will be very important. We also want to make sure it continues once the Task Force's recommendations are provided. I'm sure there is a process for public input once we reexamine our processes.

**Rich Moy:** On the Mississippi, I think in the last ten years they had a catastrophic flood. And because of the flood, the dikes broke in many areas and the damage was catastrophic. Because of this we need to rethink the energy of a flood and the effects of a major flood like this. You may want to go back and look at this report and see if it has applicability to what you're doing here.

**Dave Haug:** I just want to comment on Duncan Patten's past conversation. I don't think we necessarily have to lose the floodplain to still protect property. I mean, the elevation of riprap and things can be adjusted to still maintain the floodplain. In a lot of situations we can protect the bank—which will dissipate the energy—and still maintain the floodplain. Every situation is different. From the District's point we'd like to see what works the best.

**John Bailey:** It'll be interesting to get all the data in, and to see what it shows us and what it doesn't show us. From very early on, we said that we were going to let science lead us. And so some of you may think we're just wandering around and don't know where to go, but we're still waiting for the science. So we've been somewhat careful not to make judgments.

**Duncan Patten:** John, I've got to say this again and I've said it many times before, I'm listening to this group say we're going to get all this data, but I've got to re-emphasize that as far as the research is concerned, all it's doing is reducing our level of uncertainty. We don't know a certain amount, soon we'll know more, but we still won't know a certain amount. And if you think we're going to have all the answers, uh-uh, I'm sorry.

**Ellen Woodbury:** We need to be dealing with reality. There's going to be decisions made like, you're not going to move the City of Livingston; you're not going to let it go down the river. Therefore, you are going to do whatever it takes to protect it.

**John Bailey:** You're saying we're going to deal in extremes. I don't think there's anything that's going to happen on the Task Force that's going to be extreme, because we have to have consensus. I think what comes out of here is going to be a base, and I think we will do quite a bit; but I certainly don't think we'll be out in the extremes, that's for everyone else to do. What we will do is get data and hopefully modeling. But will we find values that we can agree on? The discussion will be as valuable as recommendations. We all learn, we live in the community; we have to deal with the community. We have enough people and variety of people represented that a lot of interests come up. When the data rolls out, I think we'll have ideas we have not thought of. At least up until this point we have asked the data to do a specific thing. There are some people here that want bank stabilization, and I'm sure there are some that would rather have less. The fish one seems to be one where I could see some kind of a recommendation coming from this Task Force that if you're going to do some kind of rip-rap, there's specific things to facilitate better fishing.

## **The group then began to address Category 2. Training and Educational Needs:**

**John Bailey:** One question I have about the next category "training and education": Do we have to get the data before we can be trained or educated on these, or should we begin it right now?

**Liz Galli-Noble:** Well I guess I would say that for the first issue on the list "permitting", we just said that we want more education on the subject; so, I think we could agree that we need that now.

**Jerry O'Hair:** Well I have big concerns about the permitting process. My concern is that you have to get different permits from different agencies.

**Laurence Siroky:** We put the 310 permit and the 404 permit on the same application.

**Jerry O'Hair:** What is meant by "wild and free flowing?" I don't know where it comes from. There are some ramifications in what we name a wild and free flowing river. I don't know if the Yellowstone has been designated that.

**Duncan Patten:** I think that type of statement was made when people were asked a general question like: What's my dream for this river? Someone said they want it to be wild and free flowing. These list of items are just statements that came out at one Task Force meeting in 1997, so it's a shopping list as much as anything.

**Bob Wiltshire:** Prior to 1996-97, the Yellowstone was trumpeted as the last free-flowing wild river in the lower 48 states. And there is no Webster's definition of what "wild", "free flowing" is. And that all came under challenge at that time. I don't know if the Task Force still feels a need to define that whole issue, or not.

**Jerry O'Hair:** The other thing I was wondering about is gravel, what do we do about it and so forth. I think included in that ought to be woody debris and the effects of it. The same effects happen with woody debris as happen with the placement of gravel.

**Liz Galli-Noble:** We will add it to the list, and it is being studied by the USGS-BRD team as we speak.

**Jerry O'Hair:** And the other one is dredging.

**John Bailey:** A lot of these are being addressed up above in the "inventory" section. Part of this training and education happens after the data is in.

**Jerry O'Hair:** Is there any kind of program or study that addresses that at all?

**Duncan Patten:** I don't know about dredging.

**Ellen Woodbury:** They used to dredge gravel commercially.

**Liz Galli-Noble:** The only way that this could be addressed that I can think of, just off the top of my head, is in the socio-economic assessment. We are doing historic land use. We're certainly looking into things that have happened in the community and in the valley. But other than that I can't image how that particular dredging issue would ever be addressed.

**Roy Aserlind:** Would this recent gold mining permit be under the ruse of dredging?

**Dave Haug:** No. The recent gold exploration issue is not actually a dredging operation. What they'll do is take some out and sample it and put it back in. They're going to replant the willows on top. There's really no dredging because the same yardage is coming in as going out.

**The Task Force then moved on to the next category: Category 3. Health of River: Biological and Economic**

**Dave Haug:** I think we're going to have a lot of talk after the information is in.

**Brant Oswald:** I think the process is to throw out ideas. Going through the same process won't get us anywhere unless there's some issues people think we haven't worked out.

**John Bailey:** We've had a fair amount of discussion about the health of the river and we've talked about inventory. This category may be trying to bring more of the studies together. There were a lot of concerns that the river was not healthy.

**Laurence Siroky:** As I recall each person had a different definition of what is healthy.

**Duncan Patten:** You can put the pieces together in discussing a healthy river. There's the physical side, and then there's the biological side. And if you want to get into chemistry you can. But the question is, is a muddy river a healthy river? If we start overlapping the physical and biological, maybe we could articulate a general perception of what a healthy river is. But still, there's a lot of variability and it can become philosophical. The Yellowstone is pretty much healthy but slightly degraded because of human activity.

**Bob Wiltshire:** I think that what a healthy river is, is what each of us on the Task Force can decide for ourselves based on the data presented.

**Terri Marceron:** These are good questions, and there will be good dialogue that comes out of it.

**The Task Force then skipped Category 4. Plan Development and moved onto Category 5. Social Perceptions.**

**John Bailey:** Hopefully socio-economics will answer some of these "social perception" questions.

**Jerry O'Hair:** When these studies are finished, could there possibly be a land use plan?

**John Bailey:** I hope socio-economic gives us a basis so that we can tie everything in. I assume the economic aspect will show us the incredible values associated with different areas along the river.

**Ellen Woodbury:** I don't think we can forget landowner's legal rights. What can be done and what has been done along the river in relation to that.

**The Task Force then returned to Category 4. Plan Development.**

**Bob Wiltshire:** We've visited this issue a number of times. "Plan" may not be the word that we're looking for. We really ought to be talking about "recommendations".

**Brant Oswald:** The only thing we did agree on was that the word "plan" made people nervous. We need to approach this in the same way we deal with the river, in a more comprehensive manner. We need to look at the cumulative impacts; we need to look at the big picture.

**Robert Ray:** The DEQ's perspective would be to look for recommendations for an agency plan to restore the river to it's full beneficial use, and the agency will put out it's own plan.

**Joel Tohtz:** We need to do something with the information that's helpful in making recommendations.

**Ellen Woodbury:** There's a range of options under the word "recommendations" that's not under "plan".

**John Bailey:** How are we going to come to agreement on these recommendations?

**Roy Aserlind:** Take for instance the riparian study. I wouldn't feel comfortable making recommendations because I don't understand the data. I would feel more comfortable with the researchers making recommendations and then we agree or disagree on them.

**John Bailey:** That's out of bounds for the researchers.

**Laurence Siroky:** We'll have the information and then we can make our recommendations based on the data findings. If there were a trend, the data would indicate that trend.

**Roy Aserlind:** Can we take what the researchers see to be happening off-the-books and then let it be up to the Task Force to make decisions?

**Duncan Patten:** One thing you shouldn't do with the scientists is to ask them to make value judgments. You will see changes as the presentations roll in, and there are fair game questions to try and get you to the point of making recommendations. They will not put values on their findings. You could try some "what if" scenarios. There's nothing wrong with asking them about what's going on with the processes, but just don't make them juggle the public/scientific hat. There are fair and unfair questions, for example: why did this happen? What are the consequences of our Task Force recommendations?

**John Bailey:** We need to make sure that we only have one researcher come in at time, and when researchers are here presenting to the Task Force, that's all we'll deal with at that meeting.

**Laurence Siroky:** It would be nice if we could get a summary of what they've collected.

**Duncan Patten:** We need a standard for the scientists, a set of certain things that need to be covered. That's why we're going back through this list. You're not going to get a full-blown report, because the data probably won't be available at that time. We could put together a preliminary report to help you get an idea of the way the data is going.

**Bob Wiltshire:** We should create a common approach for all the scientists and studies. There should be a common protocol for research team presentations. We could use abstracts in advance of presentations. Reports should be written for the common audience, not a technical audience.

**Jeanne Marie Souvigney:** Will a summary or outline be available to the public? I'm asking for it to be available.

**John Bailey:** I'm hoping to set deadlines far enough in advance that we could.

**Liz Galli-Noble:** Would it help if information can be posted on our Task Force website?

**Jeanne Marie Souvigney:** That would be fine.

**Bob Wiltshire:** Where will we be getting management recommendations? Are we looking at a much bigger issue? Or is the biggest issue that we will be addressing going to be bank stabilization?

**John Bailey:** I would think with all the studies we could get much further than bank stabilization. We want to address river processes, to make recommendations for stretches of the river instead of the whole county.

**Bob Wiltshire:** Where do we limit our recommendations?

**John Bailey:** We're not going to make recommendations until the scientists come back and present the data. When we think there's enough data, then we'll discuss it. Right now we don't have enough to do anything. We need to have a set basis for interpreting the data. This process will bring up further ideas on how to set limits for recommendations.

**Duncan Patten:** I understand we need a format for the researchers, but whatever handouts we have available before the presentations will come out of the preliminary research, and we may not have that when they initially present. I don't want researchers to write out extensive texts for that purpose because it will be a waste of their time. When the Task Force wants to hear and how TAC wants to present, it hopefully fits together.

**Chuck Dalby:** It would be good to research the watershed groups that currently exist to gather the trends of cause and effect. That will give us a common base.

**Duncan Patten:** Again, we can say “if we do this...what will happen?” and there's nothing wrong with that to see what they say and how it's answered.

**Terri Marceron:** How are we going to do it; come up with this process? Should we get a team together to scope a process or processes?

**John Bailey:** What processes have we used to get to this point? We may need more structure in the future. Do we need to have a researcher or two come in before we can decide on a process?

**Terri Marceron:** There are some basic components that we need to agree upon soon: logistics, understood format for presentations, preliminary handouts, getting the word out to the public, specific questions to ask each and every researcher, etc.

**Burt Williams:** You need to have consistent presentations (trends, synthesis, prediction, etc.).

**Bill Moser:** The advisory committee needs to be finished with the math and peer review by the time they present for the second time. In the past, we spent a lot of money on a traffic study that didn't do anything in the long run.

**Duncan Patten:** The statistics will be done by then, in other instances there may be more trends we need to explore, it will depend on what questions come up from the Task Force members themselves.

**Joel Tohtz:** We need to be confident that the people we picked are good at what they do.

**Laurence Siroky:** Won't the TAC play an integral role in reviewing the studies?

**John Bailey:** The question is, do we want to revisit how we are going to deal with the presentations and the science, and the format in which to do so before September?

**Ellen Woodbury:** How do we get from point A to point B?

**Liz Galli-Noble:** I've been actively doing research on how to get there, how to formulate recommendations. I will provide the Task Force with examples of processes that other groups have used to make recommendations.

**Ellen Woodbury:** We need to find a way that we can all get together, that we can agree on. We need to discuss processes that may work for the Task Force.

**Laurence Siroky:** Maybe a good process would be to:

1. Hear a presentation.
2. After that presentation, we would throw out recommendations (value based), they would be “draft” and preliminary.
3. Then we would hear the next presentation.
4. And afterwards repeat the process and make additional draft recommendations. As we go, we would revisit past recommendations and modify them given the new information presented.
5. The final step would be pulling together all the past ideas/recommendations, and building on them to make final recommendations.

**Duncan Patten:** There should be dialogue between the researchers and the Task Force during and after each presentation, so questions should be asked to clarify or address differing perspectives. I would hope that we don't need a unanimous result to throw scenarios out on the table.

**Bob Wiltshire:** This is definitely an issue to carry on to the next meeting, we should address it specifically at the next meeting.

**Liz Galli-Noble:** I'm asking you all at this table, what do you think is the most appropriate way to go about doing this?

**Laurence Siroky:** We need to all be able to consent to the process.

**John Bailey:** How far have we left ourselves open for criticism if we don't have formal rules?

**Laurence Siroky:** There are no bad ideas, but we need to have the exchange of ideas. There's three or four really effective ways to devise a dispute process that is built up on science.

**Ellen Woodbury:** We could invite an expert(s) to come and educate us on the subject.

**Liz Galli-Noble:** I'd like to have at least three good examples to present to you by the next meeting.

**Bob Wiltshire:** If you believe there's an outside person who may be effective, I think you should go ahead and bring them in.

The Task Force concluded this discussion by informally agreeing to address some or all of the following at the next Task Force meeting:

1. Discuss and agree upon a process by which to formulate recommendations; or appoint a team to do so.
2. Review and approve scientific reports and presentations formats to be used by all research teams (this may need to be addressed at the August Task Force meeting).
3. Discuss and schedule needed educational/training sessions: permitting processes, SAMP, etc.

## **V      Schedule Next Task Force Meeting**

The next Task Force meeting is scheduled for:

**Tuesday, July 23, 2002** at the Yellowstone Inn at 7:00 pm, and  
**Tuesday, August 27, 2002** at the Yellowstone Inn at 7:00 pm.

## **VI      The meeting was adjourned at 10:30 pm.**

## **Attachment A. December 9, 1997 Task Force Brainstorming Session**

The Task Force brainstormed a lengthy list of topics in response to two general questions:

What are the issues that the Task Force should consider?

What does the Task Force want to do?

The topics and issues listed were then grouped into six general categories, as follows:

### **1. Inventory**

Two categories:

(a) What we know, compiled from currently available data.

(b) What we need to find out; information that is not readily available.

Describe the setting:

How did the Task Force get here?

Where is the Task Force headed?

Fish data available  
Stabilized banks  
Basic flow of river  
Stages  
GIS information  
Grazing and land use practices  
Role of fires  
Woody debris  
Chemistry  
Roads  
Crossings  
Roles and interactions of tributaries  
Uses of river and locations  
Survey—topographic  
Groundwater—losing and gaining  
Geology  
Water quality and testing  
Hydrology  
Flood plain  
Watershed hydrology  
Gravel: where does it come from? Where does it go?  
Sedimentation  
TMDL  
Need Park Service and Forest Service participation

## **2. Training & Educational Needs** **(for the Task Force, public, landowners, and governmental agencies)**

Permitting. Is there a conditional permitting process? Flexibility and consistency  
Educate ourselves about the results of our inventory  
Case histories/legal rights  
What have the floods meant for the river?  
Role of fires  
Role and place of bank stabilization  
What is wild and free flowing?  
Chemistry, physics, biology of river  
Definitions  
History  
Economic values  
Watershed hydrology  
Understanding unique character of the Yellowstone River  
Floodplain importance and 100-year flood  
Gravel: what do we do about it? When are gravels essential to a healthy river? When are they not? What is equilibrium?  
Cottonwood and willow regeneration  
Dredging

## **3. Health of the River: Biological and Economic**

What is being done now?  
What is a healthy river? For example: describe the river, muddy ...is this healthy?  
What effects have barbs and other actions had on the river?  
Pre- and post-flood fishery status  
Continued development of the floodplain  
Who "call" the river healthy?  
Can we define health? When? Why? Healthy for whom?  
What are indicators of health?

Scenic values  
Role of fires

### **1. Plan Development**

Develop a comprehensive plan  
Develop a plan that adapts to changing circumstances  
Conditional Corps permit—for example, one process?  
For a healthy river  
Water quality—targeting restoration efforts  
Compliance—monitoring

### **2. Social Perceptions / Roles**

Loss of private property  
Harmony between growth and a wild river  
Concessions to keep the river wild and flowing  
Economic value  
Technical and financial assistance for studies and actions (bank stabilization)  
Facilitate a “meeting of minds” regarding the river and potential and /or real actions on it  
Role of society in helping facilitate sound decision-making  
Who will provide the floodplain?  
Continue to live along the river  
Continued development of floodplain  
Encouraging a comprehensive approach—articulate and implement  
Legal rights

### **3. Implementation**

Compliance  
Monitoring  
Enforcement

## **Attachment B. Duncan Patten's presentation addressing how Task Force research is addressing originally identified issues**

### **Inventory**

- (a) What we know, compiled from currently available data.
- (b) What we need to find out; information that is not readily available.

Fish data available <b>FWP + TF (USGS-BRD, MSU)</b>	Survey—topographic <b>TF</b>
Stabilized banks <b>TF</b>	Groundwater—losing and gaining <b>Literature</b>
Basic flow of river <b>USGS</b>	Geology <b>Literature</b>
Stages <b>USGS + TF (USGS)</b>	Water quality and testing <b>USGS NAWQA</b>
GIS information <b>TF (mapping)</b>	Hydrology <b>USGS</b>
Grazing and land use practices <b>TF (NRCS, MSU)</b>	Flood plain <b>TF (NRCS, MSU)</b>
Role of fires <b>USFS + others (literature)</b>	Watershed hydrology <b>?</b>
Woody debris <b>TF (USGS-BRD)</b>	TMDL <b>?</b>
Chemistry <b>USGS- NAWQA</b>	Sedimentation <b>TF</b>
Roads <b>} TF (maps, topo, etc)</b>	Gravel: where does it come from?
Crossings	Where does it go? <b>TF (USGS, DNRC)</b>
Roles and interactions of tributaries <b>?</b>	Need Park Service and Forest Service participation
<b>NA</b>	
Uses of river and locations <b>TF (SE)</b>	

### **Training & Educational Needs**

**(for the Task Force, public, landowners, and governmental agencies)**

Permitting. Is there a conditional permitting process? Flexibility and consistency  
Educate ourselves about the results of our inventory  
Case histories/legal rights  
What have the floods meant for the river? **TF (historic)**  
Role of fires **USFS + others**  
Role and place of bank stabilization **TF (USGS, USGS-BRD)**  
What is wild and free flowing? **?**  
Chemistry, physics, biology of river **?**  
Definitions  
History  
Economic values **TF (SE)**  
Watershed hydrology **?**  
Understanding unique character of the Yellowstone River **?**  
Floodplain importance and 100-year flood **USGS + TF data**  
Gravel: what do we do about it? When are gravels essential to a healthy river?  
When are they not? What is equilibrium? **TF (USGS-BRD, DNRC, etc.)**  
Cottonwood and willow regeneration **TF (UM, historic)**  
Dredging **?**

**Note: Duncan Patten did not address the remaining categories in his presentation.**